

Operating instructions



Analog Universal Module HART for Zone 1

> 9468/32



1 Contents

1	Contents	2
2	General information	2
2.1	Manufacturer	2
2.2	Information regarding the operating instructions	2
2.3	Conformity with standards and regulations	2
3	Symbols used	3
4	General safety notes	3
4.1	Operating instructions storage	3
4.2	Safety notes	3
4.3	Alterations and modifications	4
4.4	Special versions	4
5	Intended use	4
6	Components	5
6.1	Overview	5
6.2	Pluggable terminal X1	5
7	Technical data	6
8	Transport and storage	9
9	Installation	9
9.1	Dimensions / fastening dimensions	9
9.2	Installation conditions	9
9.3	Mounting and operating position	10
9.4	LED indications and troubleshooting	11
9.5	Dismounting / replacement of the module	12
10	Maintenance, overhaul and repair	13
10.1	Maintenance	13
10.2	Repair instructions	13
11	Disposal	13
12	Accessories and spare parts	14
13	EC Declaration of Conformity	15

2 General information

2.1 Manufacturer

R. STAHL Schaltgeräte GmbH
Am Bahnhof 30
74638 Waldenburg
Germany

Phone: +49 7942 943-0
Fax: +49 7942 943-4333
Internet: www.stahl-ex.com





2.2 Information regarding the operating instructions

ID-No.: 218078 / 946860310010
Publication code: 2013-01-18-BA00-III-en-00

2.3 Conformity with standards and regulations

Conformity with standards and regulations is specified in the corresponding certificates and the EC Declaration of Conformity. These documents can be downloaded from our homepage www.stahl-ex.com.

3 Symbols used





	Safety notes Non-compliance can result in material damage, serious injuries or death. The safety notes contained in these operating instructions and affixed to the device must be observed!
	Warning symbol Danger due to explosive atmosphere!
	Warning symbol Danger due to live components!
	Note This graphic marks important additional information, tips and recommendations.

4 General safety notes

4.1 Operating instructions storage

Read these operating instructions carefully and store them near the installation place. For correct operation, please observe all other documents enclosed in this delivery and the operating instructions of the equipment to be connected.

4.2 Safety notes

 WARNING	
	Use the devices only for their intended purpose! ► We cannot be held liable for damage caused by incorrect or unauthorized use or by non-compliance with these operating instructions. ► Use the device only if it is undamaged and clean.
 WARNING	
	Any unauthorized work on the device is prohibited! Installation, maintenance, overhaul and repair may only be carried out by authorized and appropriately trained personnel.



Observe the following information during installation and operation:

- Any damage can invalidate the explosion protection
- National and local safety regulations
- National and local accident prevention regulations
- National and local assembly and installation regulations
- Generally recognized technical regulations
- Safety notes in these operating instructions
- Characteristic values and rated operating conditions on the rating plates and data plates
- Additional information plates on the devices

Additional safety notes:

- ▶ The analog universal module HART Type 9468/32 is approved for use in gas hazardous areas of Zone 1, Zone 2 and in the safe area.
- ▶ The analog universal module HART Type 9468/32 is approved for use in dust hazardous areas of Zone 21 and Zone 22.
- ▶ For operation in gas or dust hazardous areas, the module must be installed in an enclosure which fulfills the requirements of IEC/EN 60079-0.
- ▶ The module must be mounted on the BusRail 9494 only.
- ▶ A distance of 50 mm must be maintained between intrinsically safe and non-intrinsically safe electric circuits.
- ▶ Modules with intrinsically safe and non-intrinsically safe field circuits may be operated simultaneously on one BusRail. In this case, a distance of 50 mm must be maintained between the terminals of intrinsically safe and non-intrinsically safe electric circuits (e.g. partition 220101 or empty space).
- ▶ The safety-related maximum values of the connected field devices must match the values of the modules according to data sheet, operating instructions or EC type examination certificate.
- ▶ Interconnections of several active intrinsically safe circuits can result in different safety-related maximum values. This can endanger the intrinsic safety so that an appropriate proof must be provided.
- ▶ Modules and plug connectors may be connected and disconnected during operation in hazardous areas (hot-swap und hot-plug).
- ▶ To avoid electrostatic charging, the modules in hazardous areas must be cleaned only with a moist cloth.

4.3 Alterations and modifications

 WARNING	
	Alterations and modifications to the device are not permitted. We shall not accept any liability or warranty obligations for damage resulting from alterations and modifications.

4.4 Special versions

In case of additional/different order options, special versions may differ from the description given here.

5 Intended use

The analog universal module HART is used for connecting of up to 8 intrinsically safe analog standard signals 0/4 ... 20 mA to the IS1 remote I/O system. The digital communication with connected field devices can take place bidirectionally via the HART protocol. Each channel can be parameterised as input for connecting 2-wire transmitters including transmitter supply or as output for connecting positioners or indicators. The Ex i inputs and outputs are short-circuit proof and galvanically separated from the system.

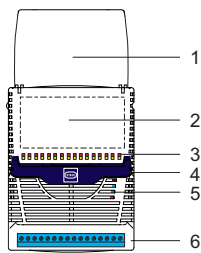
Compatible spare for IS1 I/O modules:

Series 9460/12*), 9461/12 *), 9465/12 and 9466/12

*) for operation with active 4-wire HART transmitters, a 9164 is additionally required for each channel

6 Components

6.1 Overview



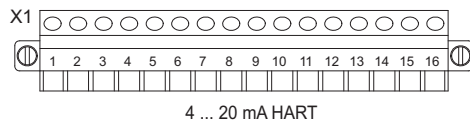
15322E00

1	Operating flap with insert label (open) and connection diagram
2	Module data (serial number, hardware revision number, software revision number, manufacturing date, e.g.: 123456DE9999 Rev.A 01-01 0508)
3	LEDs (red) for error indication (wire breakage/short circuit) for each channel
4	Notch lever for removing the module from the BusRail
5	LED for operation indication ("RUN", green), error ("ERR", red) and maintenance ("M/S", blue) (for further information, see "LED indications and troubleshooting")
6	Pluggable terminal X1 with two safety screws

6.2 Pluggable terminal X1

For the module, a pluggable terminal X1 (screw-type terminal 162702 or spring clamp terminal 162695) for connection of field devices is available as accessory (not included in the scope of delivery of the module!).

The pluggable terminal X1 has 16 terminals for connection of the field cables.



15324E00

Terminal assignment

	X1 2-wire input/output with HART	X1 3-wire input with HART	X1 4-wire input
Channel	Terminals	Terminals	Terminals
0	1(+), 2(-)	supply 1(+), signal 2(+), common 4(-)	2(+), 4(-)
1	3(+), 4(-)	--	--
2	5(+), 6(-)	supply 5(+), signal 6(+), common 8(-)	6(+), 8(-)
3	7(+), 8(-)	--	--
4	9(+), 10(-)	supply 9(+), signal 10(+), common 12(-)	10(+), 12(-)
5	11(+), 12(-)	--	--
6	13(+), 14(-)	supply 13(+), signal 14(+), common 16(-)	14(+), 16(-)
7	15(+), 16(-)	--	--

NOTICE



The channels have no common connection to earth among themselves.

NOTICE



Mixed operation of 2-wire / 3-wire / 4-wire is permissible. In case of 3- and 4-wire operation, each following channel (1, 3, 5, 7) must be used for common connection.

In case of 4-wire operation, the following information and restrictions apply:

Only for connection of maximum 4 galvanically separated, unearthed intrinsically safe field circuits. HART-communication is not supported.

For use of earthed field circuits and/or HART communication, a device Type 9164 is required for each 2-wire channel.

Safety-related limiting values: U_o , I_o , P_o , C_i and L_i are negligible.

Maximum connectable safety characteristic values during operation with active 4-wire transmitters:

Max. input voltage U_i [V]	Max. input current I_i [mA]	Max. ambient temperature T_{amb} [°C]
28	150	55
28	140	60
28	130	65
28	115	70
28	105	75

7 Technical data

Explosion protection

Global (IECEx)

Gas and dust

IECEx DEK 12.0054X
Ex ia [ia Ga] IIC T4 Gb
[Ex ia Da] IIIC

Europe (ATEX)

Gas and dust

DEKRA 12 ATEX0173 X
Ex II 2 (1) G Ex ia [ia Ga] IIC T4 Gb
Ex II (1) D [Ex ia Da] IIIC

USA (FM)

in preparation

Certificates and approvals

Certificates

IECEx, ATEX

Further parameters

Installation

in Zone 1, Zone 2, Zone 21, Zone 22 and in the safe area

Safety data

Max. voltage U_o

24.4 V

2-wire input/output

Max. current I_o

80 mA

Max. power P_o

488 mW

Max. connectable
inductance L_o /capacity C_o

IIC

L_o [mH]	3.8	2	1	0.5	0.2
C_o [nF]	53	59	71	88	119

IIB

L_o [mH]	23	10	2	1	0.5	0.2	0.1	0.05
C_o [nF]	370	430	430	470	550	700	860	890

3-wire input

Max. current I_o

81.8 mA

Max. power P_o

499 mW

Max. connectable
inductance L_o /capacity C_o

IIC

L_o [mH]	3.6	2	1	0.5	0.2
C_o [nF]	53	58	70	87	119

IIB

L_o [mH]	21	10	2	1	0.5	0.2	0.1	0.05
C_o [nF]	380	420	420	470	550	700	860	890

Max. internal capacity C_i

negligible

Max. internal inductance L_i

negligible

Electrical data

Ex i inputs/outputs

Number of channels 8 (each with adjustable parameters as input or output)

Supply voltage for 2-wire transmitter 16 V (at 20 mA)

Nominal signal range 0 ... 20 mA / 4 ... 20 mA

Digital communication HART protocol

Min. signal 0 mA

Max. signal

For inputs 23.5 mA

For outputs 22.8 mA (4 ... 20 mA) / 23.5 mA (0 ... 20 mA)

Signal transmission

Filter time constant (adjustable parameters)

small

medium

50 Hz, 60 Hz

Resolution in the range 4 ... 20 mA

14.75 bit
(with HART: 12.75 bit)

14.75 bit

14.75 bit

Maximum delay from signal / internal bus

32 ms

120 ms

500 ms

Transient response output (10...90 %)

40 ms

Max. short-circuit current

For inputs

24 mA

For outputs

22.8 mA (4 ... 20 mA) / 23.5 mA (0 ... 20 mA)

Max. input resistance for each channel

14.1 Ω

Max. load resistance (output)

750 Ω at 20 mA
700 Ω at 21.8 mA

Galvanic separation

Test voltage

acc. to standard

EN 60079-11

Between auxiliary power/ system components

≥ 1500 V AC

Between two I/O modules

≥ 500 V AC

Between I/O channels/ system components

≥ 500 V AC

Between I/O channels/ ground (PA)

≥ 500 V AC

Electromagnetic compatibility

Tested to the following standards and regulations:
EN 61326-1 (2006) IEC 61000-4-1 ... 6, NAMUR NE 21

Electrical connection

Power supply

BusRail Types 9494

Ex i field signals

Pluggable, blue terminals, 16-pole, 2.5 mm², screw- or spring-type versions with lock

Auxiliary power

Version

Intrinsically safe Ex ia via BusRail

Max. current consumption

220 mA
(at 20 mA per channel)

Max. power consumption

5.3 W
(at 20 mA per channel)

Max. power dissipation

Only outputs

3.7 W
(at 20 mA, 500 Ω per channel)

Only inputs

2.7 W
(at 20 mA per channel)

Device-specific data

Settings

Module

Diagnostics message

ON / OFF

Signal filter

small / medium / big 50 Hz / large 60 Hz

Scan HART live list

ON / OFF

Signal

Signal type

Input / output

Signal range

0 ... 20 mA / 4 ... 20 mA

Measuring range input

2.4 ... 22.8 or 23.5 mA / 3.6 ... 21 mA (acc. to NAMUR)

Line fault monitoring

ON / OFF

Behaviour in case of error

Input: -10 %, 0 %, 100 %, 110 %, alarm code, hold last value

Output: -10 %, 0 %, 100 %, 110 %, hold last value

Cyclic transmission of HART variables

no / 4 HV / 8 HV

Accuracy of measurement

Error of measurement with filter time constant

small

medium

50 Hz, 60 Hz

Maximum error of measurement

0.075 %
(12 µA at 4 ... 20 mA)

0.05 %
(8 µA at 4 ... 20 mA)

0.05 %
(8 µA at 4 ... 20 mA)

Ambient temperature influence

< 0.03 % / 10 K

Note

All values in % of the signal span at 23 °C

Ambient conditions

Ambient temperature

-40 ... +75 °C

Storage temperature

-40 ... +80 °C

Maximum relative humidity

95 % (without condensation)

Semi-sinusoidal shock
(IEC EN 60068-2-27)

15 g (3 shocks per axis and direction)

Sinusoidal vibration
(IEC EN 60068-2-6)

1 g in the frequency range 10 ... 500 Hz
2 g in the frequency range 45 ... 100 Hz

Mechanical data

Degree of protection (IEC 60529)

IP20

Module enclosure

polyamide 6GF

Fire resistance (UL 94)

V2

Pollutant class

corresponds to G3

Dimensions

L = 128 mm, W = 96.5 mm, H = 67 mm

Indication

LED indication

Module requires maintenance

LED "M/S", blue

Operating state

LED "RUN", green

Group error

LED "ERR", red

Channel error

LED red for each channel

Function indication

Retrievable parameters

Manufacturer, Type, hardware revision, software revision, serial number

Error indication

Module status and alarms

- Internal bus error primer / redundant
- No response from IOM
- Configuration does not correspond to the module
- Hardware error
- Excess temperature
- Slot error
- Module requires maintenance

Signal errors for each channel

Signal status bit

"0" = signal disturbed; "1" = signal valid

Wire breakage input

< 2.4 mA / < 3.6 mA (adjustable parameters, at 4 ... 20 mA)

Short circuit input

> 23.5 mA or > 22.8 mA / > 21 mA (adjustable parameters)

Wire breakage output

Terminal voltage > 16 V (response range 16 ... 16.5 V) or output current can no longer be set

Short circuit output

Output load < 60 Ω (response range 40 ... 60 Ω)

Mounting / installation

Mounting orientation

horizontal or vertical

Mounting type

on 35 mm DIN rail NS 35/15 (DIN EN 60715)

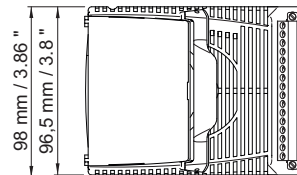
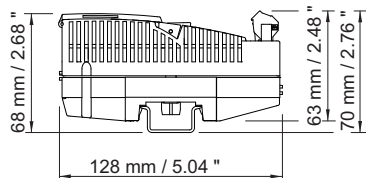
8 Transport and storage

- ▶ Transport and storage are only permitted in the original packaging.
- ▶ The devices must be stored in a dry place and vibration-free.

9 Installation

9.1 Dimensions / fastening dimensions

Dimensional drawings (all dimensions in mm / inches) - subject to modifications





01927E00

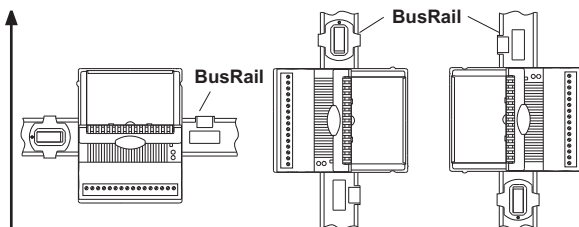
9.2 Installation conditions

⚠ WARNING	
	The national installation instructions (e.g. IEC/EN 60079-14) must be observed. Ensure that there is a distance of at least 50 mm (safety distance) between connecting units of intrinsically safe and non-intrinsically safe circuits!
⚠ WARNING	
	<p>If the installation has strong electromagnetic sources of interference, use of shielded field cables is recommended. In this case, the shield must be connected to the equipotential bonding of the hazardous area! For this purpose, the shields of the field wiring must be connected to the shield busses installed in the enclosure as close to the entry point as possible!</p> <p>The shield busses must be also connected to the mounting plate close to the entry point of the field wiring using the shortest possible way!</p>

9.3 Mounting and operating position

Mounting the module on BusRail


NOTICE	
	The module and pluggable terminal X1 can be safely connected or disconnected during operation in a hazardous area (hot swap).
NOTICE	
	Module operation is permitted only in the following mounting positions: Vertical mounting with pluggable terminal below, on the left or right.



05683E00

- ▶ Position the module vertically on the provided slot of the BusRail
- ▶ Snap module into place by slightly pressing it

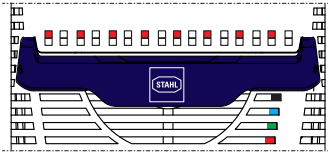
Connecting field devices to the module

NOTICE	
	The mounting can be carried out with connected or disconnected terminal. In the operating flap, there is a insert label which can be used to enter the assignment of the field devices to the channels. Labelling of the insert label can be performed, for example by means of the IS Wizard.

- ▶ Connect field devices to terminal X1 according to terminal assignment (see on the front or on insert label under the operating flap) (tightening torque for screw-type terminals 0.5 ... 0.6 Nm)
- ▶ Place the field wiring shields (if present) as close to the entry point on the grounding rail as possible
- ▶ Plug the pluggable terminal X1 into the module and secure it against loosening using safety screws (tightening torque 0.5 ... 0.6 Nm)
- ▶ Mount partition if necessary (distance between intrinsically safe and non-intrinsically safe electric circuits at least 50 mm)

9.4 LED indications and troubleshooting

Meaning of the LEDs



15406E00

- ▶ LED "RUN", green = operation indication
- ▶ LED "ERR", red = module error indication
- ▶ LED "M/S", blue = requires maintenance or outside specification
- ▶ 8 x LED, red = error in the respective field circuit


Indication overview


	Module state	Error source	Possible solution
LED "RUN", green			
ON	Normal operation	--	--
FLASHES	In standby (switched on but no data exchange with master yet)	The module is in proper condition but is not ready for cyclic data exchange yet (there is no parameter set available yet). Outputs in a state without power.	<ul style="list-style-type: none"> • Activate the cyclic data transfer with the master • Check master, bus connection and CPM
OFF	No function	No supply voltage at the I/O module or I/O module is defective.	<ul style="list-style-type: none"> • Check system supply • Check CPM or CPU&PM • Check the BusRail • Engage the I/O module correctly on the BusRail • Replace the I/O module
LED "ERR", red			
OFF	No error	--	--
FLASHES	External error	Error in the field circuit: wire breakage, short circuit, measuring range exceeded/ not reached	<ul style="list-style-type: none"> • Check signal LEDs "red" • Eliminate the cause in the indicated field circuit, check electric lines and field device
	Incorrectly configured module	Configuration is not correct or a wrong module is connected	<ul style="list-style-type: none"> • Change configuration in the automation system or connect the right module
	Outputs in safety position	Cyclic data transfer with the automation system has been interrupted	<ul style="list-style-type: none"> • Check the cyclic data transfer of CPM or CPU (LCD or LED "RUN") • Check bus connection • Activate the cyclic data transfer with the automation system
ON	Module error	Module is defective	<ul style="list-style-type: none"> • Replace the module
LED "M/S", blue			
OFF	Normal operation	--	--
FLASHES	External maintenance required	Ambient temperature is outside the specification	<ul style="list-style-type: none"> • Reduce ambient temperature by means of, e.g. shading or cooling <p>Note: If the problem is not eliminated, the module will be permanently damaged</p>
ON	Maintenance required	Slot error or module is damaged by excess temperature or end of the service life reached	<ul style="list-style-type: none"> • Replace the module as soon as possible within the next 12 months, otherwise there is a risk of module failure

	Module state	Error source	Possible solution
8 x LED, red			
ON	Normal operation	--	--
FLASHES	Signal error	Line breakage or short circuit, measuring range exceeded/ not reached	• Eliminate the cause in the indicated field circuit, check electric lines and field device

9.5 Dismounting / replacement of the module

 WARNING	
	If a partition is mounted, first pull out terminal X1 from the module to be replaced.

NOTICE	
	When replacing the module by a module identical in construction, the set parameters are maintained. No further user adjustments are necessary. When replacing the module by a module with a different function, the module reports a configuration error (red LED "ERR" flashes). The module must be either re-parameterised or it is necessary to connect a module of the right type.

NOTICE	
	If an IS1 module is replaced by an IS1+ module with the same functions, the IS1+ module functions in the compatibility mode (= identical functionality). If new IS1+ functions must be used, it may be necessary to update the software of CPM 9440 or CPU 9441. In case of PROFIBUS DP operation, a new GSD may be required. If required, contact your responsible distributor for further information.


- ▶ Loosen safety screws of the pluggable terminal X1
- ▶ Pull out the terminal from the module
- ▶ If required, remove the partition
- ▶ Pull the blue notch lever of the module upwards to unlock the module
- ▶ Remove the module vertically from the BusRail
- ▶ Position the new module vertically onto the BusRail and snap into place by slightly pressing it
- ▶ If required, snap partition into place between modules
- ▶ Plug the pluggable terminal X1 into the module and secure it against loosening (tightening torque 0.5 ... 0.6 Nm)

10 Maintenance, overhaul and repair


10.1 Maintenance

The module does not require regular maintenance.

- ▶ Observe the function according to intended use
- ▶ Follow the directives according to IEC/EN 60079-17
- ▶ Adhere to permissible temperatures according to IEC/EN 60079-0

NOTICE	
	If the blue LED "M/S" lights up continuously, it is recommended to replace the module in the foreseeable future. Otherwise there is a high probability that the module will fail in 12 months (see "LED indications and troubleshooting").







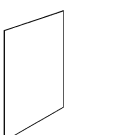


10.2 Repair instructions

NOTICE	
	Repair must be performed by the manufacturer only! When repair is required, send the module to your responsible sales organization (for the address, see chapter 2.1).

11 Disposal

- ▶ Observe the national waste disposal regulations.

12 Accessories and spare parts

⚠ WARNING				
<div>  <p>Explosion hazard due to wrong or insufficient spare parts or wrong accessories! For components with relevant Ex protection, use only suitable, certified spare parts or corresponding accessories of R. STAHL Schaltgeräte GmbH or other manufacturers. Otherwise, explosion protection cannot be guaranteed any longer. R. STAHL Schaltgeräte GmbH cannot be held liable for damage caused by ignoring this danger.</p> </div>				
Designation	Figure	Description	Art. no.	Weight kg
Plug-in terminal	 02079E00	2.5 mm ² with lock, 16-pole, screw connector, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits Labelling: 1 ... 16	162702	0.028
	 02077E00	2.5 mm ² with lock, 16-pole, spring clamp connection, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits, incl. test jacks Labelling: 1 ... 16	162695	0.028
mA - Isolating Repeater	 10389E00	The mA isolating repeaters are used for the connection of 4-wire transmitters to active 2-wire inputs and for the galvanic separation. Input: sink, Ex e Output: sink, Ex i	160166	0.107
	 04653E00	The mA isolating repeaters are used for the connection of 4-wire transmitters to active 2-wire inputs and for the galvanic separation. Input: sink, Ex i Output: sink, Ex i	160165	0.075
Labelling strips	 05869E00	"FB Addr ... Mod No ..." for pluggable terminal, sheet with 26 strips	162788	0.001
DIN A4 sheet	 09900E00	For label plate on I/O modules; 6 labels on each sheet; print-out using IS Wizard; packaging unit = 20 sheets	162832	0.001
Partition	 15196E00	For mounting between intrinsically safe and non-intrinsically safe connections of the I/O modules, in order to adhere to the required 50 mm distance	220101	0.000
Warning sign	 05872E00	"Clean modules only with a damp cloth."	162796	0.001

13 EC Declaration of Conformity

EG-Konformitätserklärung EC Declaration of Conformity Déclaration de Conformité CE



R. STAHL Schaltgeräte GmbH • Am Bahnhof 30 • 74638 Waldenburg, Germany
erklärt in alleiniger Verantwortung, declares in its sole responsibility, déclare sous sa seule responsabilité,

dass das Produkt: Analog Universal Modul HART
that the product: Analog Universal Module HART
que le produit: Module analogique universel HART

Typ(en), type(s), type(s): 9468/3b-08-1f (b = 2, 3 ; f = 0, 1)

mit den Anforderungen der folgenden Richtlinien und Normen übereinstimmt.
is in conformity with the requirements of the following directives and standards.
est conforme aux exigences des directives et des normes suivantes.

Richtlinie(n) Directive(s) Directive(s)	Norm(en) Standard(s) Norme(s)
94/9/EG: ATEX-Richtlinie 94/9/EC: ATEX Directive 94/9/CE: Directive ATEX	EN 60079-0: 2012 EN 60079-11: 2012 EN 60079-15: 2010
Kennzeichnung für, marking for, marquage pour: 9468/32-08-1*	II 2 (1) G Ex ia [ia Ga] IIC T4 Gb II (1) D [Ex ia Da] IIC CE 0158
Kennzeichnung für, marking for, marquage pour: 9468/33-08-1*	II 3 (1) G Ex nA ia [ia Ga] IIC T4 Gc II (1) D [Ex ia Da] IIC CE 0158
EG-Baumusterprüfbescheinigung: EC Type Examination Certificate: Attestation d'examen CE de type:	DEKRA 12 ATEX 0173 X (DEKRA Certification B.V., Utrechtseweg 310, 6812 AR Arnhem, The Netherlands)
2004/108/EG: EMV-Richtlinie 2004/108/EC: EMC Directive 2004/108/CE: Directive CEM	EN 61326-1: 2006
Sonstige Normen: Other Standards: Autres normes:	EN 50178: 1997 EN 61010-1: 2010

Waldenburg, 07.02.2013

Ort und Datum
Place and date
Lieu et date

i.V.

M. Kaiser
Leiter Zertifizierung Produkte
Automatisierung
Head of Certification Products Automation
Directeur Certification Produits Automation

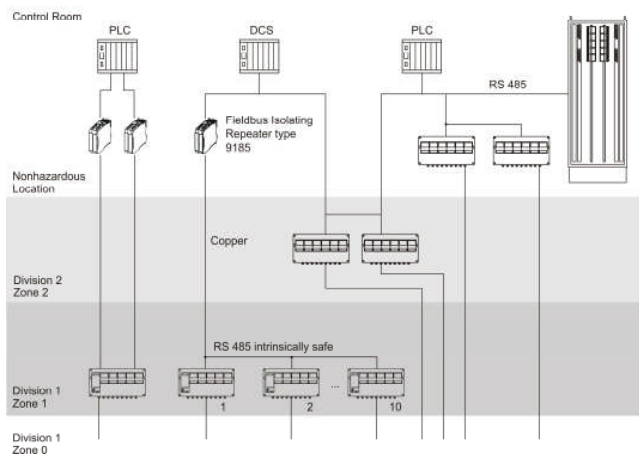
i.V.

J.-P. Rückgauer
Leiter Qualitätsmanagement
Director Quality Management
Directeur Assurance de Qualité

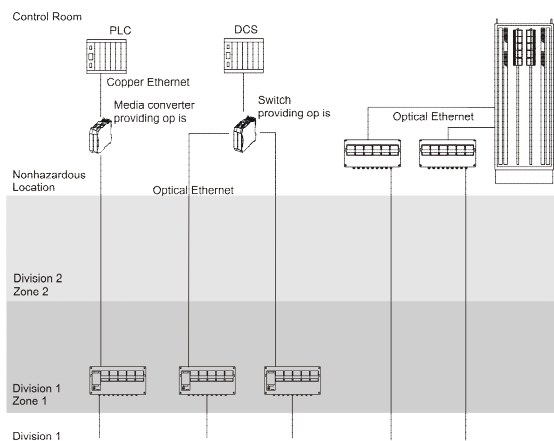
F-4174-601 01/2011 STMZ

9468 6 002 001 0_00

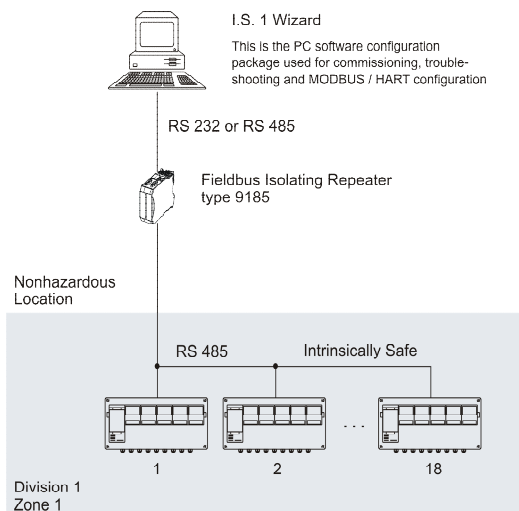




Example for Fieldbus System Topology with Bus Isolators interfacing Automation control systems with DIV 1 / Zone 1 installation of IS1 resp. IS1+ Remote I/O System



Example for Ethernet System Topology with Isolators Interfacing Automation control systems with DIV 1 / Zone 1 installation of IS1 resp. IS1+ Remote I/O System



Service Bus with Isolating Repeater interface

The IS1 resp. IS1+ Remote I/O is a DIN rail mounted system designed to record and output process control signals between hazardous location transducers, sensors and a nonhazardous location automation system. It consists of electrical apparatus in a Class I, Division 1 or Class I, Zone 1 hazardous locations linked by an intrinsically safe field bus installed per the National Electrical Code, ANSI/NFPA 70 Article 500.

The intrinsically safe field bus circuit is achieved with the use of the Fieldbus Isolating Repeater type 9185 (copper to copper interface) or 9186 (fiber optic to copper interface). These devices reside in the nonhazardous location and provide an intrinsically safe field bus circuit for connection to the IS1 resp. IS1+ Remote I/O System. See example to the left.

The apparatus located in the Division 1 or Zone 1 hazardous location are referred to as Remote I/O, and consist of the following major subsystems.

Notes:

- CPU & Power Module, Type 9440**
The CPU and Power Module contains a power supply unit for its own power supply, as well as for the supply to the I/O modules and the field circuits. The power supply to the I/O modules is implemented via the BusRail. For the configuration with a redundant CPU and Power Module the power supply to the I/O modules is decoupled with diodes. The power supply unit has an undervoltage monitoring circuit.

The CPU fulfils the function of a gateway between the internal bus of an IS1 field station and the fieldbus which connects the field station with the automation system. The gateway is constructed as a dual processor system. The I/O processor controls the data exchange with the I/O modules and, when plugged-in, with the redundant CPU & Power Module. The communication processor controls the data exchange on the fieldbus, the redundant fieldbus and on the Service Bus.

The communication with the I/O modules is implemented via the address and data lines on the BusRail. The interface of the CPU & Power Module with the internal data bus on the BusRail is designed with redundancy.

- CPU Module Type 9441 and Power Module Type 9444**
The IS1 System for Ethernet uses a separate Power Module and CPU Module pluggen onto an associated Socket instead of the CPU&Power Supply Type 9440. Except for the external communication which is achieved via optical fibre interface, the Power Module and the CPU Module provide similar functions as the CPU&Power Module type 9440.
- Components of Remote I/O System**
All I/O Modules are manufactured in a unique DIN rail mount package which then mount onto the Remote I/O system BusRail.
- Refer to pages 4 through 25 for information specific to each module.

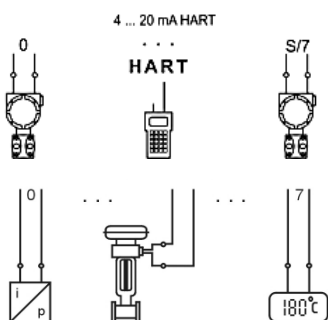
GENERAL NOTES:

- Installation should be in accordance with Article 504/505 of the National Electrical Code, ANSI/NFPA 70 and ANSI/ISA RP12.06.01 resp. with the Canadian Electrical Code, Part I.
- Use a general purpose enclosure meeting the requirements of ANSI/ISA S82 for use in nonhazardous or Class I, Division 1 hazardous (Classified) Locations.
- Use an FMRC Approved or NRTL listed Dust-ignitionproof enclosure appropriate for environment protection in Class II, Division 1, Groups E, F and G; and Class III, hazardous (Classified) Locations.
- Substitution of components may impair suitability for Zone 1 and / or Intrinsic Safety.

The safety relevant statements of this document may be transferred into the operating instructions. Transferring the text, editorial changes of equivalent meaning are allowed.

			2013	Date	Name	Certification drawing		Scale
			drawn	08.02.	Reistle	IS1 resp. IS1+ Remote I/O System Overview		none
			checked		Kaiser			Sheet 1 of 32
02	26.02.2014	Bagusch				9400 6 031 001 1		Agency FM
01	22.01.2014	Bagusch						
Version	Date	Name				Ers. f.	Ers. d.	A4

Nonhazardous
Class I, II, III, Division 1, Group A-G
or Class I, Zone 1, Group IIC/IIB
Hazardous (Classified) Locations



FM approved i/p converters, positioners, indicators

Wiring legend

Connection allocation – Analog Universal Module HART Type 9468

	X1 / 2-Wire Input/Output	X1 / 3-Wire Input	X1 / 4-Wire Input
Channel	Terminals	Terminals	Terminals
0	1(+), 2(-)	supply 1(+) signal 2(+) common 4(-)	2(+), 4(-)
1	3(+), 4(-)		
2	5(+), 6(-)	supply 5(+) signal 6(+) common 8(-)	6(+), 7(-)
3	7(+), 8(-)		
4	9(+), 10(-)	supply 9(+) signal 10(+) common 12(-)	2(+), 4(-)
5	11(+), 12(-)		
6	13(+), 14(-)	supply 13(+) signal 14(+) common 16(-)	2(+), 4(-)
7	15(+), 16(-)		

WARNING: Substitution of components may impair Intrinsic Safety.
AVERTISSEMENT: Substitution de composants peut compromettre la sécurité intrinsèque.

The Type 9468 Analog Universal Module HART is designed to receive a digital output from the IS1 CPU & Power Module and output a corresponding analog signal to positioners, loop distance, etc.. It is also designed to input analog signals from a hazardous location transmitter and output a representative digital signal for processing by the IS1 CPU & Power Module. The module is intrinsically safe for installation in a Class I, II, III, Division 1, Group A-G or Class I, Zone 1, Group IIC/IIB hazardous location according to NEC Article 504/505 and provides intrinsically safe connections for the hazardous locations listed below.

Entity parameters for wiring configuration to the left are as follows:

2-Wire input/output circuits $V_{OC} = 24.4 \text{ V}$
 $I_{SC} = 80 \text{ mA}$
 $P_O = 488 \text{ mW}$

CL I, DIV 1, A,B / Zone 0, GP IIC		CL I, DIV 1, C-G / Zone 0, GP IIB/IIC	
La [mH]	Ca [nF]	La [mH]	Ca [nF]
3.8	53	23.0	370
2.0	59	10.0	430
1.0	71	2.0	430
0.5	88	1.0	470
≤ 0.2	119	0.5	550
		0.2	700
		0.1	860
		≤ 0.05	890

3-Wire input/output circuits $V_{OC} = 24.4 \text{ V}$
 $I_{SC} = 81.8 \text{ mA}$
 $P_O = 499 \text{ mW}$

CL I, DIV 1, A,B / Zone 0, GP IIC		CL I, DIV 1, C-G / Zone 0, GP IIB / IIC	
La [mH]	Ca [nF]	La [mH]	Ca [nF]
3.6	53	21.0	380
2.0	58	10.0	420
1.0	70	2.0	420
0.5	87	1.0	470
≤ 0.2	119	0.5	550
		0.2	700
		0.1	860
		≤ 0.05	890

4-Wire input/output circuits $V_i = 28.0 \text{ V}$
 $C_i = \text{negligibility}$
 $V_{OC} = \text{negligibility}$
 $I_{SC} = \text{negligibility}$
 $P_O = \text{negligibility}$
 $L_i = 150 \text{ mA at } T_{amb} \leq 55^\circ\text{C}$
 $l_i = 140 \text{ mA at } T_{amb} \leq 60^\circ\text{C}$
 $l_i = 130 \text{ mA at } T_{amb} \leq 65^\circ\text{C}$
 $l_i = 115 \text{ mA at } T_{amb} \leq 70^\circ\text{C}$
 $l_i = 105 \text{ mA at } T_{amb} \leq 75^\circ\text{C}$

Notes:

- Intrinsically safe apparatus shall be an FM approved System or Entity device connected in accordance with the manufacturer's installation instructions.
- For Entity concept use the appropriate parameters from above to ensure the following:
 $V_{OC} \text{ or } V_i \leq V_{max}$ $C_a \geq C_i + C_{leads}$
 $I_{SC} \text{ or } I_t \leq I_{max}$ $L_a \geq L_i + L_{leads}$
- Suitable separation must be maintained between wiring of each I.S. input channel.
- General Notes (see Page 1)

The safety relevant statements of this document may be transferred into the operating instructions.
Transferring the text, editorial changes of equivalent meaning are allowed.

			2013	Date	Name	Certification drawing		Scale
			drawn	08.02.	Reistle	Analog Universal Module HART Type 9468/32-08-1*		none
			checked		Kaiser			Sheet 13 of 32
02	26.02.2014	Bagusch			STAHL	9400 6 031 001 1		Agency FM
01	22.01.2014	Bagusch						
Version	Date	Name				Ers. f.	Ers. d.	A4